



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: **Betsy M. Sutherland**

Serial No.: **09/837,560**

Examiner: **Lori A. Clow, Ph.D.**

Filed: **April 18, 2001**

Group Art Unit: **1631**

Title: **METHOD FOR ASSAYING CLUSTERED DNA DAMAGES**

DECLARATION UNDER 37 CFR 1.132

Mail Stop Non-Fee Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I, Betsy Sutherland, Ph.D., declare and state as follows:

1. I am an inventor of the subject matter claimed in U.S. Application Number 9/837,560 and a copy of my *curriculum vitae* is attached to this paper. In addition, I am co-author of the Sutherland et al. reference listed in item 2 below.
2. Prior to making this Declaration I studied the following documents:
 - a) U.S. Application Number 09/837,560;
 - b) the Office Action mailed from the Patent Office on August 26, 2003 in connection with U.S. Application Number 09/837,560; and
 - c) references cited in the above-identified Office Action including Sutherland et al. (*PNAS* 97: 103-108 (2000)).
3. The concept of inventorship under U.S. patent law has been explained to me by patent counsel representing the Assignee and I understand that to be an inventor, one must contribute materially to the conception of the claimed invention.

4. Authorship of the cited Sutherland et al. reference differs from inventorship of the subject application in that Paula V. Bennett, Olga Sidorkina, and Jacques Laval are listed as coauthors but not as inventors.

Paula V. Bennett provided technical support in reducing the invention of U.S. Application Number 09/837,560 to practice. Specifically, this individual conducted experiments relating to the stated invention solely under the direction of myself. Paula V. Bennett did not contribute at the conceptual level to the invention as claimed.

The contributions of Olga Sidorkina and Jacques Laval were also strictly technical in nature. More specifically, they provided enzymes for use as reagents in experiments relating to the stated invention. These individuals did not contribute at the conceptual level to the invention as claimed.

5. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signature	Betsy M. Sutherland
Name	Betsy Sutherland, Ph.D.
Date	7 Nov, 2003

**Betsy M. Sutherland**

Biology Department, Brookhaven National Laboratory, Upton NY 11973
E-mail BMS@BNL.GOV; Voice 631 344-3380 or -3293; FAX 631 344-3407

Born: New York, NY

Ethnic origins: American (Hispanic)

Education:

Emory University, Atlanta, Ga.	B.S.	1964	Biology
Emory University, Atlanta, Ga.	M.S.	1965	Biology
University of Tennessee – Oak Ridge National Laboratory	Ph.D.	1967	Radiation Biology
Walter Reed Army Inst of Research	NIH Postdoctoral fellow, 1967-1969		
University of California, Berkeley	Postdoctoral fellow, 1969-1972		

Employment/ Experience:

1994-present	Head, Biology Department Radiobiology Program
1988-present	Senior Biochemist, Brookhaven National Laboratory, Upton, NY, Biology Department (tenured)
1977-1988	Biochemist, BNL, Biology Department, (tenured)
1975-1977	Associate Professor, University of California, Irvine, Department of Molecular Biology and Biochemistry (tenured)
1972-1975	Assistant Professor, University of California, Irvine, Department of Molecular Biology and Biochemistry
1969-1972	University of California, Berkeley, Department of Molecular Biology and Virus Laboratory, laboratory of Michael J. Chamberlin. DNA photoreactivating enzymes
1967-1969	Walter Reed Army Institute of Research, Dept of Molecular Biology, laboratory of F.E. Hahn. Pyrimidine dimer formation in DNA in the presence of intercalating drugs
1965-1967	Oak Ridge National Laboratory - Ph.D. research, Biology Division, laboratories of R.F. Kimball and R.B. Setlow. DNA repair in Paramecium
1964-1965	Emory University –M.S. Research, Biology Department, laboratory of Charles Ray. Histones in Tetrahymena

Current Research

Research in my laboratory focuses on focus on relationships between radiation-induced DNA damages and their effects in higher organisms. We use a multidisciplinary approach, frequently involving collaborators in other fields—biophysicists and physicians, as well as ecologists, and plant physiologists, geneticists and breeders—to complement our molecular approaches to radiation damage and repair. Areas of current research are:

- Clustered DNA Damages Induced by Ionizing Radiation
- Radiation, DNA Damage and Oncogenesis
- Ultrasensitive DNA Damage Quantitation
- DNA Damage and Repair in Human Cells and Tissues: Hematopoietic Stem Cells & Skin
- UV Sensitivity and Productivity of Crop Plants

Fellowships & Awards

Emory University	University fellowship
Oak Ridge Associated Universities	Oak Ridge graduate fellowships
National Institutes of Health	Postdoctoral fellowship; Dept. Molecular Biology Walter Reed Army Institute of Research
University of California, Berkeley	Postdoctoral; Dept. of Mol Biology and Virus Lab
National Institutes of Health	Research Career Development Award
Internat. Assoc. de Photobiologie	Edna M. Rowe Memorial Award
U.S. Department of Energy	Ernest Orlando Lawrence Memorial Award (first woman recipient)
Brookhaven Town, Suffolk Cty	Outstanding Service to Science
University of Tennessee, Knoxville	Alumni Academic Hall of Fame

Societies

Phi Beta Kappa
 Phi Kappa Phi Honor Society
 New York Academy of Sciences
 American Institute of Biological Sciences
 American Association for the Advancement of Science
 American Association of University Women
 American Society for Photobiology
 American Society for Biochemistry and Molecular Biology
 Society for In Vitro Biology
 Environmental Mutagen Society
 Radiation Research Society
 Photomedicine Society

Teaching Experience

1971-1972	University of California, Berkeley Graduate Methods Course in Molecular Biology
1972-1977	University of California, Irvine Undergraduate biochemistry (Metabolism of Nucleic Acids) Undergraduate biochemistry and molecular biology laboratory Radiation Biology Graduate Molecular Biology Medical school, Biochemistry: DNA repair in humans Advanced graduate seminar Graduate and undergraduate research topics
1983-1984	State University of New York, Stony Brook Graduate course in molecular and cellular biology: DNA repair
1997	Health Physics Society Course on Non-Ionizing Radiation, invited lecturer on Health Risks of Ultraviolet Radiation, San Antonio TX
1993-1998	Brookhaven National Laboratory MiniCourse: DNA Damage Quantitation by Gel Electrophoresis; Students from academic, industrial and national laboratories, US & international.
2001	NATO Summer Institute on Environmental & Medical Effects of Radiation , invited lecturer, Pisa, Italy

Postdoctoral fellows

Dr. William Farland, 1976-1979, UC, Irvine and BNL Photoreactivating enzymes

Present address: U. S. Environmental Protection Agency, Washington, D.C.

Dr. Prasad Koka, 1978-1981, *E. coli* photoreactivating enzyme.

Present address: UCLA School of Medicine

Dr. Sharon Moore, 1981-1983, Human cell transformation.

Present address: Frederick Cancer Research Facility

Dr. Anthony Blackett, 1981-1983, DNA damage in human skin in situ.

Present address: University of Manchester Institute of Science and Technology (UK)

Dr. Seyma Ogut, 1983-1985, Human photoreactivating enzyme.

Present address: The University of Maryland

Dr. Abbie Freeman, 1984-1986, Human cell transformation.

Present address: The University of South Carolina

Dr. Steven Freeman, 1984-1986, DNA damage in human skin in situ.

Present address: University of South Carolina

Dr. Daniel Brown, 1985-1987, Synthetic endonucleases,

Present address: RTP Research Institute, Inc.,

Dr. Maxine Santoro, 1986-1988, Gene expression in transformed human cells.

Present address: Bridgewater, NJ

Dr. Haim Hacham, 1987- 1990. DNA damage and repair in human skin.

Present address: Israeli Ministry of Health, Haifa, Israel

Dr. Elsie Quait, 1989-1992, DNA damage in plants.

Present address: Argonne National Laboratory, Chicago, IL.

Dr. S. Ray, 1989-1992, DNA repair in human skin at the genomic and single gene level.

Present address: Medical University of South Carolina, Charleston SC

Dr. V. Hejmadi, 1995-1996, DNA repair in humans and bacteria.

Present address: University of Bath, U.K.

Dr. M. Vazquez, 1995-1998, Heavy ion damage to neural tissues.

Present address, Medical Department, BNL.

Dr. J.M. Song, 2000- 2001, Formation of clustered damages in DNA by UV radiation. Present address, Oak Ridge National Laboratory.

Dr. Peter Guida, 2000- present, Repair of clustered damages in mammalian cells.

Dr. Alex Georgikilas 2001-present, Induction and repair of clustered DNA damages.

Dr. S. Paul, 2001-present, Repair of clustered damages in human cells.

Dr. M. Hada, (Senior Research Associate), 2002-present, Role of strand breaks in damage clusters

Graduate Students**Doctor of Philosophy**

Dr. Lawrence Beck, 1977-1981, University of California, Irvine, and BNL. Studies on a Photoreactivating Enzyme from *Drosophila melanogaster* Cultured Cells. Present address: University of Colorado

Dr. Robert Snapka, 1975-1978, University of California, Irvine, and BNL. Physical and Chemical Properties of DNA Photoreactivating Enzyme from *Escherichia coli*. Present address: Ohio State University

Master of Science

Charles O. Fuselier, University of California, Irvine, 1976

Sabbatical/ Senior Visitors

- Dr. Stephen G. Oliver, 1977, Genetics of Photoreactivation, Permanent (current) affiliation: The University of Manchester Institute of Science and Technology (United Kingdom)
- Dr. Adelaide Faljonio-Alario, 1979, 1981, Energetics of photoreactivating enzymes, Permanent affiliation: Instituto de Quimica, Universidade do Sao Paulo, Brazil
- Dr. Gordon Fisher, 1979, 1981, Action spectra for cell killing by misonidazole, Permanent: Departement de radiobiologie, Centre Hospitalier Universitaire, Sherbrooke, Quebec, Canada (deceased).
- Dr. Olga Oliveira, 1980-1981, *E. coli* photoreactivating enzyme, Permanent affiliation: Departamento de Alimentos et Nutrica, Faculdade de Ciencias Farmaceuticas, Campus de Araraquara, Brazil
- Dr. Giovanni Ciarrocchi, 1981, 1982, 1983, 1984, *E. coli* photoreactivating enzyme, Permanent affiliation: Istituto di Genetica Biochim. ed Evoluzionistica, Consiglio Nazionale delle Ricerche, Pavia, Italy
- Dr. Masaki Shioda, 1988, Human cell transformation, Permanent affiliation: University of Tokyo.
- Dr. Tsugio Shiroya, 1981-3, 1986, Sea urchin photoreactivating enzyme, Permanent affiliation: University of Tokyo (deceased)
- Dr. Megumi Hada, 1997, DNA damage and repair in plants. Permanent affiliation, Kobe Univ, Kobe, Japan
- Dr. Shinnosuke Takayanagi, 1992-8, Photoreactivating enzyme in alfalfa and soy bean, Permanent affiliation: Toho University School of Medicine, Tokyo, Japan.
- Dr. Jun Hidema, 1994, 1995, 1997, 1998, 1999 DNA damage and repair in UV sensitive and resistant rice strains, Permanent affiliation: Tohoku University, Sendai, Japan.
- Dr. Haim Hacham, 2000, Isolation of DNA from model organisms. Permanent affiliation: Israeli Ministry of Health, Haifa, Israel
- Dr. Yong Sook Son, 2002, DNA damage in human skin cells. Permanent affiliation: Korea Cancer Center Hospital, Laboratory of Tissue Engineering, Seoul, Korea.
- Dr. Hee-sun Kim, 2002/3, DNA damage quantitation. Permanent affiliation: Radiation Health Research Institute, Laboratory of Radiation Biology, Korea Hydro and Nuclear Power Corporation, Seoul, Korea.

Undergraduate Research Students

- UC Irvine: R. Novotny
Robanne Hibbard
William Hanes
- Brookhaven: Gregory Kachejian (Bates College)
Mary Alleman (Louisiana State University)
David Sokol (Brown University)
Douglas McElroy (Southampton College)
Joseph McDonnell (Southampton College)
Katherine Hajek (University of Illinois)
Melissa Hurley (Stanford University)
Catherine Kocarek (University of Cincinnati)
Savita Mohan (Massachusetts Institute of Technology)
Amy Lepre (Massachusetts Institute of Technology)
Elliott Kirk (University of Chicago)
Hua-Yin Yu (Massachusetts Institute of Technology)
Phillip Snyder (Allegheny College)
Emily Weinert (Duke University)

Recent Visiting Graduate Students

Linda Pope, 1998-2000, University of Maryland, College Park (thesis advisor, Professor J. Sullivan), Department of Natural Resources, DNA repair in UV-sensitive soybean cultivars
Michael Folkert, 2000, Massachusetts Institute of Technology and Harvard Medical School, Cambridge (thesis advisor, Professor J. Yanch), DNA damage cluster formation by protons
P. Stasica, 2001- Fordham University (mentor, Professor Joan Roberts), Radioquenchers and DNA

Recent Post-baccalaureate Student (Fordham University program)

Christopher Orgon, 1998-2000, Fordham University, New York, (advisor, Professor Joan Roberts)

Recent Visiting Postdoctoral Fellow

Dr. X. Tan, 2000-2002, State University of New York, Stony Brook (mentor, Professor Arthur Grollman)

FUNDING

“R01”-type Grants

Current

DNA Damage Clusters: Repair in Mammalian Cells

NIH, B. Sutherland, P.I., \$166,000 (current year budget, funded for 4 years)

DNA Damage Clusters in Low Level Radiation Responses of Human Cells

Department of Energy, Low Dose Radiation Program, B. Sutherland, P.I., \$566,000 for 10/1/02-9/30/03 (year 1 budget, funded for 3 years)

Effect of Deep Space Radiation on Human Hematopoietic Stem Cells

National Space Biomedical Research Institute, A. Gewirtz (U. Penn) P.I.; B. Sutherland, Co-P.I.; B. Sutherland, budget to BMS, \$120,000, 7/1/02-6/30/03 (current year budget, funded for 3 years)

DNA Damage Quantitation by Single Molecule Laser Sizing

NIH, J. Sutherland, P.I.; B. Sutherland, Co P.I., \$100,000 for 7/1/02-30/6/03 (5 years' funding)

DNA Repair in UV Sensitive and Resistant Rice

(Japanese funding to T. Kumagi, Ph.D. and J. Hidema, Ph.D., Tohoku University, Sendai; Japan, continuing); B. Sutherland, Co P.I. (continuing funding)

Pending

Complex Space radiation-induced DNA damage Clusters in Human Cell Transformation: Mechanisms, Relationships and Mitigation

B. Sutherland, P.I., Submitted to NASA, Office of Biological and Physical Research 18/11/02. Requested budgets: year 1 \$301, 872, total request (4 years) \$1,287,461.

Support through Brookhaven National Laboratory

Current

DNA damage by heavy ions and its repair in human cells

NASA, Radiobiology Program

B. Sutherland, P.I., \$101,000 (continuing funding)

Booster Applications Facility (construction)

NASA, Radiobiology Program

B. Sutherland, budget for FY2002 (direct only), \$66,000.

Booster Applications Facility (operating)

NASA, Radiobiology Program

B. Sutherland, 1st year budget (total year budget, \$1,092,830)

Service**University of California**

Privilege and Tenure Committee, Irvine Campus & University-wide
Council of the Faculty of the School of Biological Sciences
Biohazard Safety Committee
Graduate Adviser, Department of Molecular Biology & Biochemistry

Brookhaven National Laboratory

Institutional Planning Committee, Biology Department
Chair, Service Staff Review Committee, Biology Department
Chair, Lectureship Committee
Symposium Organizer & Chair, Brookhaven Symposium in Biology, No. 36: DNA
Damage and Repair in Human Tissues, October 1-4, 1989
Member, Brookhaven Council, 1992-1997 (elected)
Chair, Brookhaven Council Sub-committee on Grant Competitiveness, 1994-1997
Chair, Scientific Advisory Committee for Radiobiology, 1994-present
Member, BNL Lectureship Committee, 1998-present
Chair, BNL Lectureship Committee, 2001-present
Member, Management Steering Committee, Standards Based Management System,
1999-
Member, Training and Qualifications Steering Committee, 2000-

National Aeronautics and Space Administration

Member, Program Committee, Space Radiation Health Investigators' Workshop, 1996
Chair, Program Committee, Space Radiation Health Investigators' Workshop, 1997
Member, Program Committee, Space Radiation Health Investigators' Workshop, 1998
Chair, Program Committee, Space Radiation Health Investigators' Workshop, 1999
Member, Program Committee, International Workshop on Space Radiobiology, 2000
Member, Program Committee, Space Radiation Health Investigators' Workshop, 2002-3

Other U. S. Government

Grant reviewer for NIH, NSF, DOE, USDA
Site Visitor for NIH, NCI; NIH, NIEHS
Site Visit review of Life Sciences Division, Johnson Space Center for NASA HQ
Member, U. S. National Committee for Photobiology (Committee of National Academy of
Sciences)
NIH Study Section, Ad Hoc Member, Low Level Radiation

Other Granting Agencies

Member, Grants Review Committee, American Cancer Society, California Division
Reviewer, Brown-Hazen Funds Grants Program
National Scientific Advisory Panel, American Federation for Aging Research
Biotechnology and Biological Sciences Research Council (UK)

Societies

Biophysical Society: member of the Council of the Photobiology Group
American Society for Photobiology: member of the Council

Journals

Photochemistry and Photobiology, Associate Editor
BioScience, Editorial Board
Mutation Research, DNA Repair Reports, Editorial Board

Publications

1. **Middleton, B.B.** (maiden name) 1965. An Evaluation of Fast Green as a Cytochemical Test for Histone Distribution in Tetrahymena, Master's Thesis, Emory University
2. **Sutherland, B.M.** 1967. Pyrimidine Dimers in the DNA of Paramecium aurelia, Ph.D. Thesis, The University of Tennessee
3. **Sutherland, B.M.**, Carrier, W.L., and R.B. Setlow. 1968. Pyrimidine dimers in the DNA of Paramecium aurelia. Biophys. J. 8:490-499.
4. **Sutherland, B.M.**, Carrier, W.L., and R.B. Setlow. 1968. Photoreactivation in vivo of pyrimidine dimers in Paramecium DNA. Science 158:1699-1700.
5. **Sutherland, B.M.** and J.C. Sutherland. 1969. Mechanisms of inhibition of pyrimidine dimer formation in deoxyribonucleic acid by acridine dyes. Biophys. J. 9:292-302.
6. **Sutherland, B.M.** and Sutherland, J.C. 1969. Inhibition of pyrimidine dimer formation in DNA by cationic molecules: role of energy transfer. Biophys. J. 10: 1045-1055.
7. **Sutherland, B.M.** and Sutherland, J.C. 1969. Probes of DNA structure and interactions: effects of Cu(II) on UV-induced pyrimidine dimer formation. Biophys.J. 9:1329-1336.
8. Sutherland, J.C. and **Sutherland, B.M.** 1969. Energy transfer in the DNA-chloroquine complex. Biochim. Biophys. Acta 190:545-548.
9. Sutherland, J.C. and **Sutherland, B.M.** 1970. Ethidium bromide-DNA complexes: wavelength dependence of pyrimidine dimer inhibition and sensitized fluorescence as probes of excited states. Biopolymers 9:639-653.
10. **Sutherland, B.M.**, Court, D and Chamberlin, M.J. 1972. Studies on the DNA photoreactivating enzyme from Escherichia coli. Transduction of the Phr gene by bacteriophage lambda. Virology 48:87-93.
11. **Sutherland, B.M.** and Chamberlin, M.J. 1973. A rapid and sensitive assay for pyrimidine dimers in DNA. Analyt. Biochem. 53:168-176.
12. **Sutherland, B.M.**, Chamberlin, M.J. and Sutherland, J.C. 1973. Deoxyribonucleic acid photoreactivating enzyme from Escherichia coli: Purification and properties. J. Biol. Chem. 248:4200-4205.
13. **Sutherland, B.M.** 1974. Photoreactivating enzyme in human leukocytes. Nature 248:109-112.

14. **Sutherland, B.M.**, Runge, P. and Sutherland, J.C. 1974. DNA photoreactivating enzyme from placental mammals: Origin and characteristics. *Biochemistry* 13:4710-4715.
15. **Sutherland, B.M.**, Rice, M. and Wagner, E.K. 1975. Xeroderma pigmentosum cells contain low photoreactivating enzyme levels. *Proc. Natl. Acad. Sci.* 72:103-107.
16. Sutherland, J.C. and **Sutherland, B.M.** 1975. Human photoreactivating enzyme: action spectrum and safelight conditions. *Biophys. J.* 15:435-440.
17. Wagner, E.K., Rice, M. and **Sutherland, B.M.** 1975. Photoreactivation of herpes simplex virus in human fibroblasts. *Nature* 254:626-628.
18. **Sutherland, B.M.** and Oliver, R. 1975. Low levels of photoreactivating enzyme in xeroderma pigmentosum variants. *Nature* 257:132-134.
19. **Sutherland, B.M.** 1975. New light on the photoreactivating enzyme. In: *Novas Tendencias em Fotobiologia, Anais do Academia Brasileira de Ciencias*, Vol. 45, Suplemento, pp. 161-165.
20. **Sutherland, B.M.** 1975. Purifying the *Escherichia coli* photoreactivating enzyme. In: *Molecular Mechanisms in DNA Repair* (R.B. Setlow and P.C. Hanawalt, eds.) Plenum Press, New York, pp. 107-113.
21. **Sutherland, B.M.** The human leukocyte photoreactivating enzyme. In: *Molecular Mechanisms in DNA Repair* (R.B. Setlow and P.C. Hanawalt, eds) Plenum Press, New York, pp. 107-113.
22. **Sutherland, B.M.** 1975. Photoreactivation in animal cells. Mini-review: *Life Sciences* 16:1-6.
23. **Sutherland, B.M.**, Oliver, R., Fuselier, C.O. and Sutherland, J.C. 1976. Photoreactivation of pyrimidine dimers in the DNA of normal and xeroderma cells. *Biochemistry* 15:402-406.
24. **Sutherland, B.M.** and Oliver, R. 1976. Culture conditions affect photoreactivating enzyme levels in human fibroblasts. *Biochem. Biophys. Acta* 442:358-367.
25. **Sutherland, B.M.** and Oliver, R. 1976. Inheritance of photoreactivating enzyme deficiencies in human cells. *Photochem. Photobiol.* 24:449-452.
26. **Sutherland, B.M.** 1976. Photoreactivation in normal and xeroderma cells. In: *Fundamentals in Cancer Prevention*. (P.N. Magee et al., eds.) Univ. Park Press, Baltimore, pp. 409-416.
27. **Sutherland, B.M.** 1977. Fundamentals of photoreactivation. *Photochem. Photobiol.* 25:413-414.

28. **Sutherland, B.M.** and Oliver, R. 1977. Photoreactivation of DNA synthesis inhibition in human cells. *Mutat. Res.* 46: 159-160.
29. **Sutherland, B.M.** 1977. Human photoreactivating enzymes. In: *Research in Photobiology*, (A. Castellani, ed.) Plenum, London, pp. 307-315.
30. **Sutherland, B.M.** 1977. Photoreactivation in mammalian cells. *Int. J. Cytol.* (Bourne et al., eds.) Academic Press, New York, pp. 301-334.
31. **Sutherland, B.M.** 1978. Photoreactivation of DNA. In: *DNA Repair Mechanisms*, (P.C. Hanawalt, E.C. Friedberg and C.F. Fox, eds.) Academic Press, New York, pp. 113-122.
32. **Sutherland, B.M.** 1978. Photoreactivation: evaluating the role of pyrimidine dimers in ultraviolet radiation-induced cell transformation. *Nat. Cancer Inst. Monogr.* 50:129-132.
33. **Sutherland, B.M.** 1978. Repair processes and their role in carcinogenesis. *Nat. Cancer Inst. Monogr.* 50:151.
34. **Sutherland, B.M.** 1979. UV photobiology: postreplication repair. In: *Synchrotron Radiation: Application in Biophysics, Biochemistry and Biomedicine*. (A. Castellani, ed.) Plenum Press, New York, pp. 271-275.
35. **Sutherland, B.M.** 1979. UV photobiology: excision repair. In: *Synchrotron Radiation: Application in Biophysics, Biochemistry and Biomedicine*. (A. Castellani, ed.), Plenum Press, New York, pp. 277-282.
36. **Sutherland, B.M.** 1979. UV photobiology: DNA damage and repair. In: *Synchrotron Radiation: Application in Biophysics, Biochemistry and Biomedicine*. (A. Castellani, ed.), Plenum Press, New York, pp. 263-269.
37. Farland, W.H. and **Sutherland, B.M.** 1979. A rapid DEAE disk assay for pyrimidine dimers in [³H] DNA. *Analyt. Biochem.* 97:376-381.
38. **Sutherland, B.M.** and Hausrath, S.G. 1979. Multiple loci affecting photoreactivation in Escherichia coli. *J. Bacteriol.* 138: 333-339.
39. **Sutherland, B.M.**, Cimino, J.S., Delihias, N., Gih, A. and Oliver, R.P. 1980. Ultraviolet light-induced transformation of human cells to anchorage-independent growth. *Cancer Res.* 40:1934-1939.
40. **Sutherland, B.M.** Photoenzyme probes of photodamage to cells and cellular DNA. *Ann. New York Acad. Sci.* 346:389-397.
41. **Sutherland, B.M.** and Hausrath, S.G. 1980. Insertion of E. coli photoreactivating enzyme into mammalian cells. *Nature* 286:510-511.

42. Sutherland, J.C., **Sutherland, B.M.** Cimino G.D. and Griffin, K.P. 1980. Photoreactivating enzyme from E. coli: Interactions with DNA and mechanisms of action. *Biophys. J.* 32:242-293.
43. **Sutherland, B.M.**, Harber, L.C., and Kochevar, I.E. 1980. Pyrimidine dimer formation and repair in human skin. *Cancer Res.* 40: 3181-3185.
44. Snapka, R.M. and **Sutherland, B.M.** 1980. Escherichia coli photoreactivating enzyme: Purification and properties. *Biochemistry* 19: 4201-4208.
45. Farland, W.H. and **Sutherland, B.M.** 1981. Analysis of pyrimidine dimer content of isolated DNA by nuclease digestion. In *DNA Repair: A Laboratory Manual of Research Procedures*, pp. 45-56, (E. C. Friedberg, and P. C. Hanawalt, eds.), Marcel Dekker, New York.
46. **Sutherland, B.M.** 1981. Purification of the E. coli photoreactivating enzyme. In: *DNA Repair: A Laboratory Manual of Research Procedures*. (E.C. Friedberg, and P.C. Hanawalt, eds.), Marcel Dekker, New York, pp. 219-227.
47. **Sutherland, B.M.** Photoreactivation. 1981. *Bioscience* 31: 439-444.
48. **Sutherland, B.M.**, Delihias, N.C., Oliver, R.P., and Sutherland, J.C. 1981. Action spectra for ultraviolet light-induced transformation of human cells to anchorage-independent growth. *Cancer Res.* 41: 2211-2214.
49. **Sutherland, B.M.** 1981. Photoreactivation in bacteria and in skin. *J. Invest. Derm.* 77: 91-95.
50. **Sutherland, B.M.** 1981. Photoreactivating enzymes. In: *The Enzymes XIV, Nucleic Acids, Part A*. (P. Boyer, ed.), Academic Press, New York, pp. 481-515.
51. Yasbin, R.E., Andersen, B.J., and **Sutherland, B.M.** 1981. Ability of Bacillus subtilis protoplasts to repair irradiated bacteriophage deoxyribonucleic acid via acquired and natural enzymatic systems. *J. Bact.* 147: 949-953.
52. **Sutherland, B.M.** and Castellani, A. 1982. Photoreactivating enzyme induction in human lymphocytes. *Photochem. Photobiol.* 35: 275-277.
53. **Sutherland, B.M.** 1982 p-Aminobenzoic acid-sunlamp sensitization of pyrimidine dimer formation and transformation in human cells. *Photochem. Photobiol.* 36: 95-97.
54. Ciarrochi, G., **Sutherland, B.M.**, and Pedrini, A.M. 1982. Photoreversal of DNA unwinding caused by pyrimidine dimers. *Biochimie* 64: 665-668.
55. **Sutherland, B.M.** and Shih, A.G. 1983. Quantitation of pyrimidine dimer content of non-radioactive deoxyribonucleic acid by electrophoresis in alkaline agarose gels. *Biochemistry* 22: 745-749.

56. Fisher, G.J., **Sutherland, B.M.**, and Sutherland, J.C. 1983. Action spectra for ultraviolet photosensitized killing of mammalian cells by misonidazole and para-nitroacetophenone. *Radiation Res.* 94: 231-238.
57. **Sutherland, B.M.** 1983. Repair of ultraviolet-light-induced damage in human skin. In: *The Use of Human Cells for the Evaluation of Risk from Physical and Chemical Agents.* (A. Castellani, ed.), Plenum, New York, pp. 197-204.
58. **Sutherland, B.M.** 1983. Ultraviolet-light-induced transformation of human primary cells. In: *The Use of Human Cells for the Evaluation of Risk from Physical and Chemical Agents,* (A. Castellani, ed.), Plenum, New York, pp. 263-273.
59. Ciarrocchi, G. and **Sutherland, B.M.** 1983. Irradiation of circular DNA with 254 nm radiation or sensitization in the presence of Ag⁺: Evidence for unwinding by photoproducts other than pyrimidine dimers. *Photochem. Photobiol.* 38: 259-263.
60. Ciarrocchi, G. and **Sutherland, B.M.** 1984. Circular DNA unwound by photoproducts other than pyrimidine dimers. *BioScience* 34: 45-46.
61. **Sutherland, B.M.** and Bennett, P.V. 1984. Transformation of human cells by DNA transfection. *Cancer Res.* 44: 2769-2772.
62. **Sutherland, B.M.** Ultraviolet light induced damage and its repair. 1984. In: *Experimental and Clinical Photoimmunology,* (R.A. Daynes, and J.D. Spikes, eds.), CRC Press, Boca Raton, Vol. 1, pp. 27-41.
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